REMARKS/ARGUMENTS

A. Status of the Claims

Claims 44-106 were pending at the time the Action was mailed. Claims 44, 47, 53-55, 58, 59, 70, 73, 82, 98 and 101 are amended herein, as described below. No new matter is added by these amendments. Claim 83 is cancelled without prejudice or disclaimer. No claims are added. Claims 44-82 and 84-106 are pending.

B. Objections To the Claims

Claims 44, 53-55 and 82 are objected to regarding the term "I/I+II." These claims have been amended to recite "I/(I+II)", as suggested by the Examiner. Support for these amendments can be found within the language of each claim, as each claim refers to a "sum of the precursor compound (I) + precursor silane (II)" as the denominator in the claimed ratio.

Claim 47 is objected to regarding the redundancy of the term "$BaTi_4O_9$." The claim has been amended appropriately.

Claims 70 and 98 are objected to regarding the recitation of "0.1 or 2." These claims have been amended to recite "0, 1 or 2", as suggested by the Examiner. Support for these amendments may be found in the specification at, for example, page 14, line through page 15, line 3.

Claim 73 is objected to regarding a grammatical error. The term "or" has been inserted as suggested by the Examiner in this claim as well as in claim 101. The term "and" has also been inserted in each of these claims for grammatical purposes.

In view of the amendments described above, Applicant respectfully requests removal of the objections.

C. The Indefinite Rejections Are Overcome

Claims 47, 49, 58, 59 and 82-106 are rejected under 35 U.S.C. § 112, second paragraph, as indefinite. Applicant respectfully traverses.

Regarding claim 47, the Examiner states that it is unclear what "CO_3O_4" refers to. Claim 47 has been amended to recite "Co_3O_4" in this regard. In view of the specification and teachings in the art, a skilled artisan would understand that CO_3O_4 was not intended, and that Co_3O_4 was intended instead. *See* MPEP § 2173.02 (claim definiteness should be assessed by taking into account the specification, the teachings in the art, and the interpretation given to a claim by one of ordinary skill in the art). The specification has been amended to reflect this correction as well.

Claims 58 and 59 have been rejected regarding the phrase "comprises only." This phrase has been replaced in each claim by "consists of."

Regarding claim 82, the Examiner asserts that the scope of layer LI is inconsistent with claims 27 and 44 in that the precursor compound (I) is not recited. Claim 82 has been amended in this regard, support for which may be found in the specification as originally filed. *See, e.g.*, originally-filed claims 27 and 44.

Claims 82 and 84-106 are rejected regarding lack of antecedent basis with respect to "precursor compound (I)" and "precursor compound (II)". These claims have been amended accordingly.

In view of the amendments described above, the rejections under 35 U.S.C. § 112, second paragraph, are overcome. Withdrawal of the rejections is therefore respectfully requested.

D. The Obviousness Rejections Are Overcome

The Examiner presents three separate obviousness rejections based on the following prior art: (1) Yamaya; (2) Yamaya and Inukai; and (3) Yamaya and Thelen. Applicant notes that

Yamaya is the primary reference in each rejection. These rejections should be withdrawn for at least the following reasons.

1. Yamaya

Claims 44-59, 61-80, 82-86 and 88-106 are rejected under 35 U.S.C. § 103(a) as unpatentable over Yamaya and Soto ("Yamaya") (U.S. Application Serial No. 2003/0087102). The Examiner contends that while Yamaya does not explicitly teach each aspect of the rejected claims, those aspects not taught by this reference are said to be achieved through routine experimentation, thereby rendering the claimed invention obvious. Action, pp 4-5.

Applicant respectfully traverses. *KSR* confirmed that the Graham Factor Analyses should be used in determining whether a claimed invention is obvious under 35 U.S.C. § 103(a). *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1739 (2007). Therefore, the following subsections set forth the (1) rejected claims, (2) scope and content of the cited art, (3) the differences between the rejected claims and the cited art, and (4) an explanation as to why these differences are not rendered obvious.

a. The rejected claims

Claim 44 is drawn to an article comprising, in part, a low index (LI) layer, having a refractive index n_D^{25} ranging from 1.38 to 1.44 obtained by deposition and hardening of a second hardenable composition and comprising the product of hydrolysis and condensation of: (i) at least one precursor compound (I) comprising four hydrolysable functions per molecule of formula

$$Si\,(W)_4$$

in which the groups W, identical or different, are hydrolysable groups and provided that the groups W do not all represent at the same time a hydrogen atom; and (ii) at least one precursor

silane (II) bearing at least one fluorinated group and comprising at least two hydrolysable groups per molecule, the molar ratio I/(I+II) of the precursor compound (I) to the sum of the precursor compound (I) + precursor silane (II) of the second composition being greater than 80%. Claims 45-59 and 61-80 depend from this claim.

Claim 82 is drawn to a process for the manufacture of an article according to claim 44, comprising, in part, depositing at least one layer of material of low refractive index (LI), by application and then hardening of a second hardenable composition, said second hardenable composition comprising the product of hydrolysis and the condensation of: (i) at least one precursor compound (I) comprising four hydrolysable functions per molecule of formula

$$Si(W)_4$$

in which the groups W, identical or different, are hydrolysable groups and provided that the groups W do not all represent at the same time a hydrogen atom, and (ii) at least one precursor silane (II) bearing at least one fluorinated group and comprising at least two hydrolysable groups per molecule, the molar ratio I/(I+II) of the precursor compound (I) to the sum of the precursor compound (I) + precursor silane (II) of the second composition being greater than 80%. Claims 83-86 and 88-106 depend from this claim.

b. Scope and content of Yamaya

Yamaya regards a multilayer laminate composed of a transparent substrate such as glass, ceramic or plastic on which are applied, in order, a protective layer, a high refractive index layer with a refractive index of at least 1.60, and a low refractive index (LRI) layer with a refractive index of not more than 1.45, each having a specific resin-based composition. Yamaya, Abstract. The resulting laminates are said to be endowed with excellent antireflective properties and mar resistance. *Id.* at para. [0002].

Yamaya describes compound (g) as having the formula SiX_4, wherein X is a hydrolyzable group. *See* paras [0040], [0103]-[0104] and [0128]. Yamaya also describes compounds (e) and (f) as fluorinated silanes. *See* paras [0099]-[0102] and [0128]. In addition, Yamaya explains compound (g) is present in silane compositions in amounts ranging from 9 to 80 mol %. Para [0140].

c. Differences between the rejected claims and Yamaya

One difference between the subject matter of the rejected claims and that of Yamaya lies in the molar ratio of $SiW_4/(SiW_4$ + fluorinated silanes)—that is, as recited in the rejected claims, the molar ratio of I/(I+II) ("the claimed ratio"). As found in present independent claims 44 and 82, this ratio is greater than 80%. Contrary to the Examiner's assertion that Yamaya fails to discuss this ratio, an analysis of Yamaya shows that this ratio is less than or equal to 80%.

The conclusion regarding this ratio in Yamaya stems from the discussion in this reference at paragraphs [0040], [0098]-[0104] and [0140]. Paragraphs [0040], [0098]-[0104] and [0128] explain that compound (g) is a compound of formula SiX_4, wherein X is a hydrolyzable group, and that compounds (e) and (f) are fluorinated silanes. Thus, compound (g) corresponds to the claimed precursor compound (I), and compounds (e) and (f) each correspond to the claimed precursor silane (II). Accordingly, the ratio of compound (g)/(compound (g) + compounds (e) and (f)) corresponds to the claimed ratio of I/(I+II).

Paragraph [0140] explains the amounts of these compounds to be employed in the Yamaya invention:

> **[0140]** It is preferable for these compounds (e), (f) and (g) to be included within the silane composition in amounts within the respective ranges of 1 to 50 mol %, 10 to 90 mol %, and 9 to 80 mol %.

(emphasis added). From this explanation, compound (g) can be present only in molar amounts up to and including 80%. Thus, in a ratio of compound (g)/(compound (g) + compounds (e) and (f)), the maximum ratio allowed is 80%. This is less than the corresponding presently claimed ratio of the precursor compound (I)/(precursor compound (I) + (precursor silane (II)), which is "greater than 80%".

d. The differences between the rejected claims and Yamaya are not obvious differences

In the context of an obviousness rejection, the Supreme Court explained the importance of "identify[ing] a reason" why a skilled artisan would be prompted to arrive at the presently claimed invention. *KSR*, 127 S. Ct. at 1741. The Court noted that there should be an "explicit" analysis regarding "whether there was **an apparent reason** to combine the known elements **in the fashion claimed** by the patent at issue." *Id.* (emphasis added). Although *KSR* involved an obviousness rejection over several references, its rationale may be applied to obviousness rejections over single references. As will be explained, there is no apparent reason to modify Yamaya in the manner suggested by the Examiner or otherwise to arrive at the presently claimed invention. Not only does Yamaya teach away from the presently claimed invention, but if one were to modify Yamaya in the fashion presently claimed, the Yamaya invention would be unfit for its intended purpose and there is no reasonable expectation that it would work.

(i) Yamaya teaches away from the claimed ratio

As described above, Yamaya discusses compounds (SiX_4) that correspond to the presently claimed precursor compounds (I) (SiW_4), wherein X and W are each hydrolyzable groups. Yamaya also discusses fluorinated silanes (compounds (e) and (f)) that correspond to the presently claimed precursor silanes (II). However, Yamaya any ratio of compound (g)/(compound (g) + compounds (e) and (f)) in Yamaya must be 80% or less, whereas the

corresponding claimed ratio of I/(I+II) is greater than 80%. There is no apparent reason why a skilled artisan would modify Yamaya to arrive at a ratio that is greater than 80%.

The Examiner contends that the "relative molar amount" with respect to this ratio is a "Result-Effective variable" such that it would be obvious to a skilled artisan to adjust this ratio *via* routine experimentation to arrive at an LRI layer with the desired properties. Action, p 5. However, Yamaya explains that molar amounts of compound (g) greater than 80% may lead to laminates that possess undesirable properties:

> "The addition of less than 9 mol % of component (g) may lead to a poor crosslink density and inadequate mar resistance, whereas more than 80 mol % may make the film too hard and thus subject to cracking."

Yamaya, para. [0140] (emphasis added). Accordingly, a ratio of compound (g)/(compound (g) + compounds (e) and (f)) should not include compound (g) in an amount greater than 80%, or detrimental results may occur. Thus, this reference teaches away from combining a precursor compound (I) (which corresponds to compound (g)) in a ratio of I/(I + II) that is greater than 80%, as recited by the present claims. A "reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the Appellant." *Tec Air Inc. v. Denso Mfg. Michigan Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999). The fact that Yamaya would lead a person down a divergent path (*i.e.*, a ratio of 80% or less) is a significant factor that weighs in Applicant's favor. *In re Gurley*, 27 F.3d 551, 554 (Fed. Cir. 1994) (confirming that a prior art reference that "teaches away" from the claimed invention is a significant factor to be considered in determining obviousness).

Since Yamaya teaches away from the claimed ratio, there can be no apparent reason why a skilled artisan would modify Yamaya to arrive at the claimed invention. For at least this reason, the obviousness rejection should be withdrawn.

(ii) Modifying the Yamaya laminates to contain the claimed ratio would render them unsatisfactory for their intended purpose

It is well-settled that "[i]f [a] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." MPEP § 2143.01. *See also In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984).

As noted above, Yamaya instructs that compound (g) (corresponding to claimed precursor compound (I)) may be present in amounts up to and including 80%. This fact alone distances Yamaya from the claimed invention, as ratios of compound (g)/(compound (g) + compounds (e) and (f)) cannot exceed 80%, unlike the claimed ratio. Moreover, Yamaya goes on to explain why that upper amount is limiting: exceeding this amount results in a film that may be too hard and subject to cracking. Yamaya, para. [1040]. Thus, modifying Yamaya to arrive at the claimed ratio of greater than 80% would render its laminates unsatisfactory for their intended purpose (*e.g.*, laminates with excellent substrate adhesion, outstanding mar resistance and antireflective properties). *See id.* at Abstract. This conclusion further demonstrates that there is no apparent reason to modify Yamaya in the fashion presently claimed.

(iii) There is no reasonable expectation of success if one were to modify Yamaya in the manner presently claimed

The teachings of Yamaya regarding the content of compound (g) in its laminates would lead a skilled artisan to believe there is no reasonable expectation of success if compound (g) were to be present in a ratio of compound (g)/(compound (g) + compounds (e) and (f)) that was greater than 80%. As discussed above, the laminates may suffer from excessive hardness and

cracking at these percentages. Consequently, the reasonable expectation would be that this modification of Yamaya would *not* work. This lack of expectation of success counsels against an obviousness rejection. *See* MPEP § 2143.02 ("Evidence showing there was no reasonable expectation of success may support a conclusion of nonobviousness.")

Further, the claimed second hardenable composition can, in a non-limiting aspect, allow for stabilization of the high index layer and can lead to good substrate adhesion and durability, particularly with respect to degradation due to UV irradiation. Specification, p 1, lines 1-5 and Examples. By comparison, there does not appear to be any reasonable expectation of success that such non-limiting characteristics could be achieved with the Yamaya laminates. This is yet another reason that counsels against an obviousness rejection. *See* MPEP § 2143.02 (a reasonable expectation of success is required when suggesting that prior art may be modified to render a claimed invention *prima facie* obvious).

2. Yamaya and Inukai

Dependent claim 81 is rejected as unpatentable over Yamaya in view of Inukai (U.S. Patent 5,081,165). Applicant traverses this rejection. The discussion above regarding Yamaya, incorporated herein, demonstrates that Yamaya fails to render independent claim 44 obvious. If an independent claim is not obvious under 35 U.S.C. § 103, then any claim depending therefrom is not obvious. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). Applicant therefore respectfully requests the withdrawal of the rejection.

3. Yamaya and Thelen

Claims 60 and 87 are rejected as unpatentable over Thelen (U.S. Patent 3,185,020). Applicant traverses this rejection. Claim 60 depends from independent claim 44, and claim 87 depends from independent claim 82. The discussion above regarding Yamaya, incorporated

herein, demonstrates that Yamaya fails to render independent claims 44 and 82 obvious. As noted above, if an independent claim is not obvious under 35 U.S.C. § 103, then any claim depending therefrom is not obvious. Applicant therefore respectfully requests the withdrawal of the rejection.

E. Conclusion

Applicants believe that the present document is a full and complete response to the Office Action mailed July 11, 2008. The present case is in condition for allowance and such favorable action is requested.

The Examiner is invited to contact the undersigned Attorney at (512) 536-3015 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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Date: October 13, 2008